

### **REMARKS/ARGUMENTS**

The Examiner is thanked for the review of the application.

Claims 1-4, and 6-9 remain in this application. Claims 10 and 11 have been added. Claims 1, 2 and 3 have been amended. Claim 5 has been canceled. No new matter has been added.

In the Office Action dated January 17, 2006, the Examiner has rejected Claim 1 under 35 U.S.C. 103(a) as being unpatentable over Ouimet et al. (US 6,078,893), and further in view of Garg, (US 6,044,357). Regarding Claim 1 the Examiner has stated that "Ouimet et al. discloses: Creating, using the computer system, a plurality of demand groups, wherein each demand group is a set of at least one product, and wherein at least one of the demand groups is a set of at least two products, (col. 5, lines 45-64, [shows demand is described for each item in a given group where the product is represented by the item, in this case, one of the demand groups being a set of at least two products is inherent since Ouimet et al. discloses that 'each item in a given group' implies that there are more than one items in a group since the sales of 'one' item can depend upon the parameters of all the other items]); Creating, using the computer system, a demand group sales model as a function of price wherein said demand group sales model models sales for each demand group, (col. 6, lines 5-11, [shows a one-dimensional demand model which scales the amount of sales, in this case, the variables are simply the prices {p}, and the demand parameters  $q_i$  scales the amount of sales and  $g_i$ , which describes the sensitivity of the item to price]); Creating, using the computer system, said product sales model by combining said demand group sales model and said internal market share model, (Col. 6, lines 63-64, where the user selects a figure-of-merit function to be used to tune the demand model to the sales history, thereby creating a resulting demand model that conforms to the portions of the sales history, thereby creating a resulting demand model that conforms to the portions of the sales history data that shows a strong trend, and conform to the external market information when the corresponding portions of the sales history data show noise as shown in the abstract, lines 13-17). Ouimet et al. does not specifically disclose wherein each demand group is a group of highly substitutable products, but does disclose defining a new market model that represents and

describes how the demand parameters are expected to vary, where the demand parameters relate to the products in each demand group in col. 6, lines 17-25. However, Garg discloses: wherein each demand is a group of highly substitutable products, (Col. 13, line 65, shows inventory maintenance is implemented for products which means that these products are replaceable through inventory stock, w/Col. 14, lines 55-58 and col. 15 lines 17-18 and lines 24-26, show the selection of a first marketing mix, a selection of another marketing mix, and then the identification of which marketing mix generates the largest profit/loss, in this case, one marketing mix for products can be substituted for another marketing mix for the highest profit or loss outcome). Garg discloses this limitation in an analogous art for the purpose of showing that products within marketing mixes are interchangeable. It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention for each demand group to be a group of highly substitutable products with the motivation of having the ability to replace the products when needed. Creating, using the computer system, an internal market share model wherein said internal market share model determines the fraction of the internal sales of each demand group comprised by each product, however does disclose defining a new market model that represents and describes how the demand parameters are expected to vary, where the demand parameters relate to the products in each demand group in col. 6, lines 17-25. However, Garg discloses: creating, using the computer system, and internal a market share model wherein said internal market share model determines the fraction of the internal sales of each demand group comprised by each product, (col. 5, lines 38-41, [market share model to characterize the demand distribution for each brand, in this case, the group is represented by the brand, and the demand distribution represents a different demand resulting from sales for each product. The demand distribution will therefore vary for each brand, and therefore represents fraction of the sales]. In addition, the sales are internal since the demand groups are by a particular brand, which means that sales do not have to go to an external source for another brand). Garg discloses this limitation in an analogous art for the purpose of showing that market share models are used to set base stock levels for inventory management. It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to create a market share model for each product in each demand group with the motivation of providing a representation of how the demand distribution is represented through products."

Claim 1 has been amended to recite, in relevant part:

“creating, using the computer system, a demand group sales model as a function of price wherein said demand group sales model models sales for each demand group, further wherein said demand group sales model provides a single model for modeling sales of all of the products in each said demand group;

creating, using the computer system, an internal market share model wherein said internal market share model determines the fraction of the internal sales of each demand group comprised by each product; and

creating, using the computer system, said product sales model by combining said demand group sales model and said internal market share model, wherein said product sales model models sales for individual products.” (emphasis added)

Support for the amendments can be found in the specification as filed on page 60, lines 5 – 14. As amended, Claim 1 more distinctly the novel aspect of the instant invention wherein a demand group sales model is generated to model sales for each demand group. Ouimet ‘893, on the other hand, generates a demand model for individual products and then uses external market information to correct for noise in the product demand model. (Col 2, lines 10 – 18). Furthermore, Ouimet ‘893 describes how some of the parameters of the demand model behave according to external market information. (Col. 1, line 66 - Col. 2, line 2). Ouimet uses external sales history to correct for errors or omissions in sales history data. (Col. 2, lines 13 – 14).

The instant invention generates a sales model for the entire demand group. A demand group is a group of highly substitutable products (or items). (Specification, page 13, lines 11-13). The sales model is then generated to model sales for the group. This provides the advantage of decreasing process time and providing a more facile modeling scheme. (See specification, page 13, line 21 – page 14, line 1). Ouimet ‘893 does not teach nor suggest creating a demand group sales model. Furthermore, Ouimet et al. does not disclose any structure which is capable of modeling sales for a group of highly substitutable products as disclosed by the instant invention. Known sales models, like the one disclosed in Ouimet et al., model individual product sales. The novel demand group sales model of the instant invention, on the other hand, models group sales.

As amended, Claim 1 also more distinctly the novel aspect of the instant invention wherein an internal market share model is created wherein said internal market share model determines the fraction of the internal sales of each demand group comprised by each product. Garg '357, on the other hand, discloses "marketing mix variables" which represent marketing strategies for each of a plurality of brands of goods. (Col. 3, lines 12 – 16). The method in Garg '357 first initializes variables representing feasible marketing strategies then, based on an integrated marketing model, estimates demand for each brand by estimating consumer demand effects by marketing, and then optimizes to find which strategy maximizes profit for each brand. (Col. 3, lines 11 – 23).

In the instant invention, the market share model is the fraction of a demand group's total sales comprised by a particular product within the demand group. (Specification, page 68, lines 5-8). The instant market share model does not predict a product's share of the external market, but rather the internal analysis of a product's share of its demand group's total sales within the user's store or chain. Combined with the demand group sales model discussed above, this novel aspect of the instant invention allows one skilled in the art to calculate demand group demand as a function of price and then use internal market share to calculate a product's demand from the demand group demand. (Specification, page 115, lines 1-3).

Neither Ouimet '893, nor Garg '357 teach nor suggest the demand group sales model nor the internal market share model disclosed by the instant invention. Hence, base Claim 1, and claims 2, 6, 7, 8 and 10, which are dependent upon Claim 1, are allowable over the cited art.

The Examiner has also rejected to Claims 3-5, and 9 under 35 U.S.C. 103(a) as being unpatentable over Chavez et al. (US 6,684,193), and further in view of Ouimet et al., (US 6,078,893).

Regarding Claim 3, the Examiner has stated that "Chavez et al. discloses: Computer program instructions which, when executed by a computer, cause the computer to generate an econometric engine for modeling sales as a function of price, (Col. 7, lines 5-10 and lines 58-62, shows using the economical model to balance amount of money brought in from sales against the

costs). A imputed variable generator for generating imputed econometric variables; (col. 8, lines 22-27, [consumption distribution imputed {inferred} from components]); A coefficient estimator coupled to the imputed variable generator, and wherein imputed variables generated by the variable generator are used by the coefficient estimator to create a demand group sales model as a function of price, an internal market share model, and a combined product sales model, (col. 15, lines 6-14, [shows an example of how the revenue coefficient is incorporated into modeling the value function in a manner to account for interactive effects between the refinements and the resources that comprise that particular model]). Chavez et al. does not specifically disclose the terms 'variable generator' or 'coefficient estimator', however, does disclose an engine (col. 18, lines 23-27) that produces the same results, and therefore represents the econometric engine that contains the 'variable generator' and the 'coefficient estimator'. Therefore, the 'variable generator' and the coefficient estimator' are inherent with Chavez et al. Chavez et al. fails to disclose including a base price variable and a base volume Variable, wherein said base volume variable represents the volume of product units sold in the absence of discount pricing or other promotional effects/an imputed base price variable and an imputed base volume variable, but does disclose the generation of a model for the demand of a product in col. 53-63, and does disclose that the base parameter's values would only depend on the sales level and price in Col. 10, line 60-67). However, Ouimet et al. discloses: including a base price variable and a base volume variable/an imputed base price variable and an imputed base volume variable wherein said base volume variable represents the volume of product units sold in the absence of discount pricing or other promotional effects, (Col. 10, lines 60-65, where the base parameters in the demand model are the amount of sales and price, here the amount of sales in the volume and the price is the price, w/col. 5, lines 64-67, shows that variables that affect the demand can include promotional activity). Ouimet et al. discloses this limitation in an analogous art for the purpose of disclosing a one-dimensional demand model. It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to include a base price variable and a base volume variable with the motivation of having variables available to formulate a base demand model."

Claim 3 has been amended to recite, in relevant part:

“a coefficient estimator coupled to the imputed variable generator, and wherein imputed variables generated by the variable generator are used by the coefficient estimator to create a demand group sales model as a function of price, wherein said demand group sales model provides a single model for modeling sales of all of the products in each said demand group, an internal market share model, and a combined product sales model wherein said product sales model models sales for individual products.” (emphasis added).

With respect to the sales model, as amended, Claim 3 more distinctly the novel aspect of the instant invention wherein a demand group sales model is generated to give a single model to model sales for all of the products in each demand group. Chavez ‘193, on the other hand, generates a demand model for individual products. (Col. 7, lines 14 – 19). As discussed above, this novel aspect of the instant invention provides the advantage of more facile processing of large data sets by combining related products into demand groups. Neither Chavez et al. nor Ouimet et al. teach nor suggest a demand group sales model. Hence, Claim 3 and dependent claims 4, 9 and 11 are allowable over the cited art.

Furthermore, the instant invention offers the novel advantage of providing imputed variables generated by the variable generator and used by the coefficient estimator to generate sales models. Neither Chavez et al. nor Ouimet et al. teach nor suggest generating imputed econometric variables by inferring useful variables from missing or incomplete data sets. Chavez et al. defines a set of resources (e.g. components) which are used to support desired refinements (or products). (Col. 3, lines 25-35). After an analysis of total demand for a computer system product, a demand distribution is generated for said product. (Col. 8, lines 5-22). From this demand distribution a consumption distribution of corresponding components for said computer system product is determined. (Col. 8, lines 22-28). Chavez et al merely uses a demand distribution to directly infer a consumption distribution.

In the instant invention, on the other hand, imputation is used to obtain posterior inference when some data points are missing or data sets are incomplete in order to generate useful econometric variables. A novel and advantageous aspect of the current invention is that even when various product parameters are missing or incomplete, they may be imputed

according to the present invention. (See page 14, lines 1-2 of the specification as filed). For example, when information regarding promotional variables is missing or incomplete, other data such as sales volume is used to impute a refined promotional variable (page 45, lines 5-18 of the specification as filed). The inference here is used to impute useful variables which are incorporated into various sales models used to predict demand. The instant use of inference is with reference to the estimation of the various econometric models which are then used to optimize the chosen parameter.

An example of advantageously using the novel imputation aspect of the instant invention to infer base price variables is given in the specification on page 24, lines 15 – 23, and page 25, lines 1 -2. Here, a base price variable is inferred from the cleansed data set for a specific time window. Said base price variable may advantageously be further refined by, for example, correcting for promotional pricing (See, page 26, lines 2 – 22). Promotional prices are inferred from the cleansed data set and used to impute a refined base price variable.

Neither Chavez et al. nor Ouimet et al. teach nor suggest the imputation steps as recited in the claims of the instant invention. The imputation step solves the problem of generating econometric variables from missing or incomplete data sets. Chavez et al. does not generate such variables but simply determines a consumption distribution for secondary demand for components resulting directly from a given primary demand distribution of the corresponding system. The instant invention, on the other hand, takes point of sale information for various products, which may have missing or incomplete data, and imputes useful variables which may then be used for optimization or other useful purposes. (See, specification, p. 23, lines 4 – 7). Imputation of econometric variables is neither taught nor suggested in the prior art. Hence, base Claim 3, and claims 4, 9 and 11 which depend from Claim 3, are allowable over the cited art.

Regarding Claim 9, the Examiner has stated that “Ouimet et al. does not specifically disclose wherein said raw data includes missing or incomplete data sets, (Col. 11, lines 36-41, imperfect information). Garg discloses this limitation in an analogous art for the purpose of showing that firms do not usually know the exact strategy their competitors will adopt. It would

have been obvious to one of ordinary skill in the art at the time of the applicant's invention for raw data to include missing or incomplete data with the motivation of realistically showing the details of raw data."

Neither Ouimet nor Garg disclose imputing product parameters which are missing from product data sets by making appropriate posterior inferences as discussed above. Garg discusses missing data in the context of competitor behavior. The instant invention infers missing data from internal product data sets used to model product sales. Neither Garg nor Ouimet disclose nor imply the instant imputation step.

The Examiner has also rejected Claims 2, 7-8, under 35 U.S.C. 103(a) as being unpatentable over Ouimet et al. (US 6,078,893) as applied to claim 1 above, and further in view of Garg (US 6,044,357), and further in view of Chavez et al. (US 6,684,193).

Regarding Claim 2, the Examiner has stated that "both Ouimet et al. and Garg fail and disclose collecting, using the computer system, raw data; and generating, using the computer system, imputed variables from the raw data, wherein the imputed variables are used to create the product sales model, but Ouimet et al. does disclose generating a sales model in Col. 6, lines 5-11. However, Chavez et al. discloses: collecting, using the computer system, raw data; and generating using the computer system, imputed variables from the raw data, wherein the imputed variables are used to create the product sales model, (Col. 20, lines 24-32, [filtering and then identifying variables], w/col. 6, lines 5-11, [shows a one-dimensional demand model which scales the amount of product sales, in this case, the variables are simply the prices  $\{p\}$ , and the demand parameters  $q_i$  scales the amount of sales and  $g_i$ , which describes the sensitivity of the item to price according to product sales]). Chavez et al. discloses this limitation in an analogous art for the purpose of identifying variables that go furthest in 'explaining' the uncertainty in the particular variable of interest. It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to collecting, using the computer system, raw data; and generating, using the computer system, imputed variables from the raw data; wherein the imputed variables are used to create the product sales model with the motivation of product in a sales model with unused product data."



Regarding Claim 7, the Examiner has stated that “Ouimet et al. discloses: including a base price variable and a base volume variable/an imputed base price variable and an imputed base volume variable wherein said base volume variable represents the volume of product units sold in the absence of discount pricing or other promotional effects, (Col. 20, lines 60-65, where the base parameters in the demand model are the amount of sales and price, here the amount of sales is the volume and the price is the price, w/col. 5, lines 64-67, shows that variables that affect the demand can include promotional activity).”

Claim 2 has been amended to recite, in relevant part:

“collecting, using the computer system, raw data, wherein said raw data includes product parameter data which is missing or incomplete; and

generating, using the computer system, imputed variables from the raw data, wherein said imputed variables are used to estimate said missing or incomplete data, further wherein the imputed variables are used to create the product sales model.” (emphasis added)

As discussed above, neither Chavez et al. nor Ouimet et al. teach nor suggest generating imputed variables generated by the variable generator and used by the coefficient estimator to generate sales models. Neither Chavez et al. nor Ouimet et al. teach nor suggest generating imputed econometric variables by inferring useful variables from missing or incomplete data sets. As such, Claim 2 is allowable for at least the same reasons as discussed above.

In sum, base claims 1 and 3 have been amended and are now believed to be allowable. Dependent claim 2 has also been amended and is now believed to be allowable. Dependent claims 4 and 6-11 which depend therefrom are also believed to be allowable as being dependent from their respective patentable parent claims 1 and 3 for at least the same reasons. Hence, Examiner's rejection of dependent Claims 4 and 6-11 are rendered moot in view of the amendment to independent Claims 1 and 3. New claims 10 and 11 have been added and are also believed to be allowable. Claim 5 had been previously canceled without prejudice or disclaimer of the subject matter therein. Applicants believe that all pending claims 1-4, and 6-11 are now allowable over the cited art and are also in allowable form and respectfully request a Notice of Allowance for this application from the Examiner. Applicants also enclose our Credit Card Payment Form authorizing the amount of \$790.00 to cover the RCE fee. The commissioner is authorized to charge any additional fees that may be due to our Deposit Account No. 50-2766 (Order No. DEM1P003). Should the Examiner believe that a telephone conference would expedite the prosecution of this application, the undersigned can be reached at telephone number 925-570-8198.

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